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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/784,275	02/24/2004	Tsutomu Tetsuka	648.43518X00	8920

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EXAMINER	
ZERVIGON, RUDY	
ART UNIT	**PAPER NUMBER**
1763	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/784,275	TETSUKA ET AL.	
	Examiner	Art Unit	
	Rudy Zervigon	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 February 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4,5,7,8 and 10-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4,5,7,8 and 10-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 July 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on January 16, 2007 and February 12, 2007 are entered.

Election/Restrictions

2. This application contains claim 9 drawn to an invention nonelected with traverse in Paper No. April 20, 2006. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Claim Rejections - 35 USC § 103

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 1, 2, 4, 5, 7, 8, 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kadomura; Shingo et al. (US 6391437 B1) in view of Kawasaki; Yoshinao et al. (US 4795529 A). Kadomura teaches a plasma ("dry etching"; column 45, line 57) processing apparatus (Figure 16; column 45, line 56 - column 46, line 60) for processing a substrate (40; Figure 16; column 44 line 4) with plasma ("dry etching"; column 45, line 57) by applying a high frequency (91; Figure 16; column 46, line 1) to a reaction chamber (21a; Figure 16,22b) so as to generate plasma ("dry etching"; column 45, line 57) therein, and applying a second high

frequency (32; Figure 16) to a substrate holder (10; Figure 16) on which the substrate (40; Figure 16; column 44 line 4) is placed so as to control the ion energy to the substrate (40; Figure 16; column 44 line 4); wherein a dielectric (116; Figure 22b; column 41; lines 7-14) that is exposed to the plasma substantially covers a surface portion of an inner side wall of the reaction chamber (21a; Figure 16,22b) – claim 1

Kadomura further teaches:

i. The plasma ("dry etching"; column 45, line 57) processing apparatus (Figure 16; column 45, line 56 - column 46, line 60) according to claim 1, wherein the dielectric (112; Figure 22b - "cordierite ceramics...Al+Si"; column 39; lines 33-40) covers 90% or more (see 21a; Figure 16) of a total surface area of the inner side wall of the reaction chamber (21a; Figure 16,22b) – claim 2

Kadomura does not teach:

i. an electrically conductive member is disposed so as to be exposed to the plasma within the reaction chamber (21a; Figure 16,22b) at a position with respect to the inner side wall of the reaction chamber (21a; Figure 16,22b) which is covered with the dielectric (112; Figure 22b - "cordierite ceramics...Al+Si"; column 39; lines 33-40), and the electrically conductive member is electrically coupled to earth one of directly and through the inner side wall of the reaction chamber (21a; Figure 16,22b) so as to form a DC earth which enables direct currect to flow therein from the plasma - claim 1. Applicant's claim requirement of "so as to control the ion energy to the substrate" is a claim requirement of intended use. When the structure recited in the reference is substantially identical to that

of the claims, claimed properties or functions are presumed to be inherent (In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977); MPEP 2112.01).

ii. the electrically conductive member has an area in a range of 0.1% to 10% of the inner side wall area of the reaction chamber (21a; Figure 16,22b), a magnetic field generation means is disposed outside of the reaction chamber (21a; Figure 16,22b) so as to apply a magnetic field to the plasma, and the electrically conductive member forming the DC earth is disposed at a position crossing a magnetic line of force that is closer to the substrate holder (10; Figure 16) than a magnetic line of force that crosses the inner side wall of the reaction chamber (21a; Figure 16,22b) having the dielectric (112; Figure 22b - "cordierite ceramics...Al+Si"; column 39; lines 33-40) thereon – claim 1

iii. the conductive member has an area of the inner side wall of the reaction chamber that is exposed to the plasma – claim 2

iv. the plasma ("dry etching"; column 45, line 57) processing apparatus (Figure 16; column 45, line 56 - column 46, line 60) according to any one of claims 1 and 2, wherein the electrically conductive member forming the DC earth is located at a position within the reaction chamber (21a; Figure 16,22b) where a floating potential of plasma ("dry etching"; column 45, line 57) is substantially equal to or greater than a floating potential of the plasma ("dry etching"; column 45, line 57) at either the inner side wall of the reaction chamber (21a; Figure 16,22b) covered with the dielectric (112; Figure 22b - "cordierite ceramics...Al+Si"; column 39; lines 33-40) with respect to the high frequency (91; Figure 16; column 46, line 1) or the second high frequency (32; Figure 16), as claimed by claim 4

v. The plasma ("dry etching"; column 45, line 57) processing apparatus (Figure 16; column 45, line 56 - column 46, line 60) according to any one of claims 1 and 2, wherein the dielectric (112; Figure 22b - "cordierite ceramics...Al+Si"; column 39; lines 33-40) is a protective coating (112; Figure 22b - "cordierite ceramics...Al+Si"; column 39; lines 33-40) formed of insulating ceramic such as carbide, oxide or nitride, as exemplified by SiC, boron carbide and alumite, and a thickness d of the dielectric (112; Figure 22b - "cordierite ceramics...Al+Si"; column 39; lines 33-40) coating is determined so that, with respect to the relationship between frequency f of the high frequency (91; Figure 16; column 46, line 1) applied to the substrate (40; Figure 16; column 44 line 4) and the dielectric (112; Figure 22b - "cordierite ceramics...Al+Si"; column 39; lines 33-40) constant .epsilon. of the dielectric (112; Figure 22b - "cordierite ceramics...Al+Si"; column 39; lines 33-40), an impedance per unit area R=d/(2.pi.f.epsilon.) when high frequency (91; Figure 16; column 46, line 1) is propagated by capacitve coupling through the dielectric (112; Figure 22b - "cordierite ceramics...Al+Si"; column 39; lines 33-40) portion is 100 .OMEGA. or smaller, as claimed by claim 5

vi. The plasma ("dry etching"; column 45, line 57) processing apparatus (Figure 16; column 45, line 56 - column 46, line 60) according to any one of claims 1 and 2, wherein either a base material (112; Figure 22b - "cordierite ceramics...Al+Si"; column 39; lines 33-40) of the electrically conductive member forming the DC earth or a protective coating (112; Figure 22b - "cordierite ceramics...Al+Si"; column 39; lines 33-40) disposed on a surface of the electrically conductive member forming the DC earth and coming into contact with

the plasma ("dry etching"; column 45, line 57) is composed of conductive ceramic, SiC, Al or Al compound, as claimed by claim 7

vii. The plasma ("dry etching"; column 45, line 57) processing apparatus (Figure 16; column 45, line 56 - column 46, line 60) according to any one of claims 1 and 2, wherein when a base material (112; Figure 22b - "cordierite ceramics...Al+Si"; column 39; lines 33-40) of the electrically conductive member forming the DC earth is composed of a non-metallic material such as conductive ceramic, SiC, Al or Al compound, a conductive part (18a; Figure 22B) having a conductivity σ of 1 Ω-cm or less is provided to a surface of the base material by evaporation, spraying or interposing, thereby reducing an earth resistance of the electrically conductive member forming the DC earth (see chamber grounding - 21a; Figure 16), as claimed by claim 8

viii. that the plasma processing apparatus according to claim 4, wherein the dielectric (112; Figure 22b - "cordierite ceramics...Al+Si"; column 39; lines 33-40) is a protective coating (112; Figure 22b - "cordierite ceramics...Al+Si"; column 39; lines 33-40) formed of insulating ceramic such as carbide, oxide or nitride, as exemplified by SiC, boron carbide and alumite, and a thickness d of the dielectric (112; Figure 22b - "cordierite ceramics...Al+Si"; column 39; lines 33-40) coating (112; Figure 22b - "cordierite ceramics...Al+Si"; column 39; lines 33-40) is determined so that, with respect to the relationship between frequency f of the high frequency applied to the substrate and the dielectric (112; Figure 22b - "cordierite ceramics...Al+Si"; column 39; lines 33-40) constant E of the dielectric (112; Figure 22b - "cordierite ceramics...Al+Si"; column 39; lines 33-40), an impedance per unit area $R = d/(2\pi fE)$ when high frequency is propagated

by capacitive coupling through the dielectric (112; Figure 22b - "cordierite ceramics...Al+Si"; column 39; lines 33-40) is 100 ohm or smaller, as claimed by claim 10

ix. the plasma processing apparatus according to claim 4, wherein either a base material of the electrically conductive member froming the DC earth or a protective coating (112; Figure 22b - "cordierite ceramics...Al+Si"; column 39; lines 33-40) disposed on a surface of electrically conductive member forming the DC earth coming into contact with the plasma is composed of conductive ceramic, SiC, Al or Al compound, as claimed by claim 11

x. The plasma processing apparatus according to claim 4, wherein when a base material (114c - "PBN"; Figure 22b) of the electrically conductive member forming the DC earth is composed of a non-metallic material such as conductive ceramic, SiC, Al or Al compound, a conductive part (18a; Figure 22B) having a conductivity c of 1 ohm-cm or less is provided to a surface of the base material by evaporation, spraying or interposing, thereby reducing an earth resistance of the electrically conductive member forming the DC earth (see chamber grounding - 21a; Figure 16), as claimed by claim 12

Kawasaki teaches a plasma plasma apparatus (Figure 3) including equivalent means (10; Figure 7) for magnetic field generation. Kawasaki further teaches an electrically conductive member (11; Figure 7; column 9, lines 7-18) is disposed so as to be exposed to the plasma within the reaction chamber (4+1; Figure 7; column 9, lines 7-18) at a position with respect to the inner side wall (4; Figure 7; column 9, lines 7-18) of the reaction chamber (4+1; Figure 7; column 9, lines 7-18) and the electrically conductive member (11; Figure 7; column 9, lines 7-18) is electrically coupled to earth directly and through the inner side wall (4; Figure 7; column 9, lines 7-18) of

the reaction chamber (4+1; Figure 7; column 9, lines 7-18) so as to form a DC earth (see grounding symbol) which enables direct currect to flow therein from the plasma - claim 1. Applicant's claim requirement of "so as to control the ion energy to the substrate" is a claim requirement of intended use. When the structure recited in the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent (In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977); MPEP 2112.01).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Kawasaki's equivalent means (10; Figure 7) for magnetic field generation and to add Kawasaki's electrically conductive member (11; Figure 7; column 9, lines 7-18) with Kadomura's coating/covering to the apparatus of Kadomura, and to optimize the exposed/unexposed surface area as claimed.

Motivation to add Kawasaki's equivalent means (10; Figure 7) for magnetic field generation and to add Kawasaki's electrically conductive member (11; Figure 7; column 9, lines 7-18) with Kadomura's coating/covering to the apparatus of Kadomura is for optimal ionic acceleration and control as taught by Kawasaki (column 2, lines 3-34).

Response to Arguments

1. Applicant's arguments with respect to claims 1-5, 7, 8, and 10-12 have been considered but are moot in view of the new grounds of rejection.

Conclusion

2. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272-

1442. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official fax phone number for the 1763 art unit is (571) 273-8300. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (571) 272-1700. If the examiner can not be reached please contact the examiner's supervisor, Parviz Hassanzadeh, at (571) 272-1435.

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